

Claims

- [c1] 1. A method for regenerating a particulate filter coupled to an internal combustion engine, comprising:
commencing a self-sustaining filter regeneration;
monitoring whether said regeneration causes temperature of said particulate filter to become greater than a predetermined value;
in response to said monitoring, adjusting one or more operating parameters so as to limit exothermic reaction via control of an excess oxygen amount entering said filter and prevent temperature from rising to become greater than a pre-selected value.
- [c2] 2. The method recited in Claim 1 wherein said operating parameter is at least one of the group consisting of:
a hydrocarbon injection amount, throttle position, exhaust gas recirculation amount, variable cam timing, variable geometry turbocharger position, and port deactivation.
- [c3] 3. The method recited in Claim 1 wherein said oxygen amount is at least one of the group consisting of:
an oxygen concentration, an oxygen flow rate, an air flow rate, and a fresh air flow rate.
- [c4] 4. The method recited in Claim 1 wherein said predetermined value is equal to said pre-selected value.
- [c5] 5. A method for operating an engine coupled to a diesel particulate filter, the engine having an electronically controlled valve that adjusts oxygen flow entering the engine, the method comprising:
detecting temperature indicative of said diesel particulate filter;
controlling air flow via the valve based on said detected temperature so as to prevent temperature of the diesel particulate filter from rising to a point that causes degradation due to excessive exothermic reaction, while continuing filter regeneration.
- [c6] 6. The method recited in Claim 5 wherein the valve is at least one of an

electronically controlled throttle valve, an exhaust gas recirculation valve, a variable geometry turbocharger valve, a variable CAM timing valve, or a port deactivation valve.

- [c7] 7. A system comprising:
a diesel engine;
an electronically controlled valve coupled to said engine;
a diesel particulate filter coupled to said engine; and
a controller for commencing self-sustaining regeneration of said particulate filter, determining a desired oxygen flow, and adjusting said valve to provide said desired flow.
- [c8] 8. A system comprising:
a diesel engine;
an electronically controlled valve coupled to said engine;
a diesel particulate filter coupled to said engine; and
a controller for commencing self-sustaining regeneration based on an engine operating condition, determining if conditions are such that temperature of said particulate filter should be controlled, and in response to said determination, calculating a desired oxygen flow rate and adjusting said valve to provide said desired flow rate.
- [c9] 9. The system recited in Claim 7 wherein said determination as to whether to control particulate filter temperature is based on engine speed and engine load.
- [c10] 10. A system comprising:
a diesel engine;
an electronically controlled valve coupled to said engine;
a diesel particulate filter coupled to said engine; and
a controller for commencing self-sustaining regeneration of said particulate filter, determining temperature of the filter, and if said temperature is greater than a limit, adjusting said valve to reduce oxygen entering said filter and limit said self-sustaining regeneration reaction.
- [c11] 11. The system recited in Claim 10 wherein said electronically controlled valve

at least one of an electronically controlled and pneumatically actuated throttle valve, an exhaust gas recirculation valve, a variable geometry turbocharger valve, a variable CAM timing valve, or a port deactivation valve.

[c12] 12. The system recited in Claim 10 wherein said controller commences said self-sustaining regeneration by adjusting engine operating parameters away from normal operating conditions to raise said temperature of the filter to a temperature necessary to initiate reaction, and then returning said engine operating parameters to said normal conditions.

[c13] 13. The system recited in Claim 10 wherein said diesel particulate filter comprises SiC.

[c14] 14. The system recited in Claim 10 wherein said diesel particulate filter comprises cordierite.

[c15] 15. The system recited in Claim 10 wherein said controller limits said self-sustaining regeneration reaction by preventing temperature of said particulate filter from becoming greater than a predetermined value.